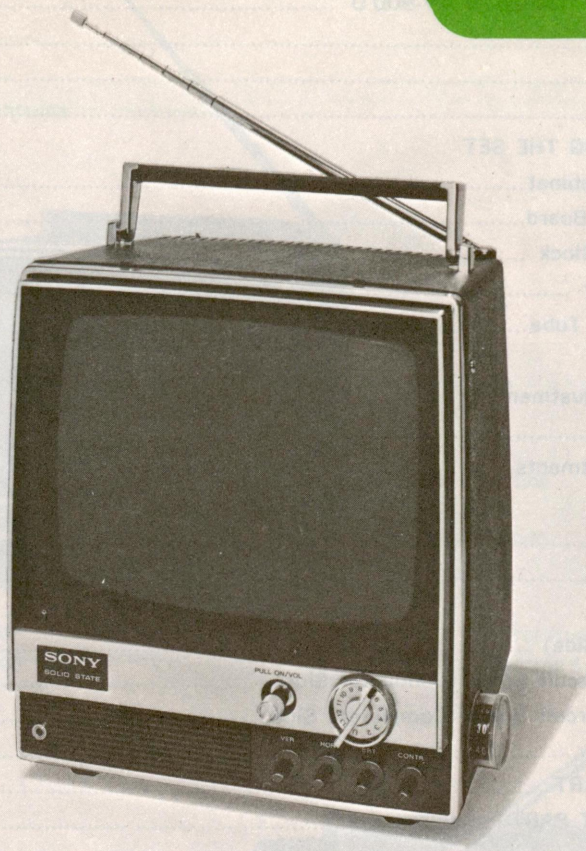
TV-905U



Specifications

Picture Tube	:	8″ (Measured Diagonally), 90° Deflection, 20 mm Neck Dia., Aluminized Screen, 230 DB 4
Transistor	:	26
Diode	:	14
Channel Coverage	:	VHF Channels A 2—A 13 UHF Channels A 14—A 83
Maximum Sensitivity	:	VHF 10 μV/10 vpp (at Picture Tube Cathode) UHF 20 μV/10 vpp (at Picture Tube Cathode)
IF Circuit	:	3 Stages with 4 Stagger Tuned Elements Video IF; 45.75 MHz, Sound IF; 41.25 MHz, Band Width; 3.0 MHz/−3 dB
Sound System	:	4.5 MHz Intercarrier System Power Output Stage, SEPP-OTL System, 300 mW Speaker, 4-1/8″ x 2-5/8″ Oval Type, Impedance; 40 ohms
Automatic Control	:	Pulse AGC, Forward AGC, Balanced Diode AFC
Power Requirement	:	AC 117 V, 50/60 Hz, DC 12 V
Power Consumption	:	AC 23 W, DC 15 W
Dimension	:	10″ (H) x 9″ (W) x 8-3/4″ (D) (252 x 228 x 223 mm)
Weight	:	10 lbs. (4.6 kgs.)
Glare Proofing	:	Black Screen

SONY®
SERVICE MANUAL

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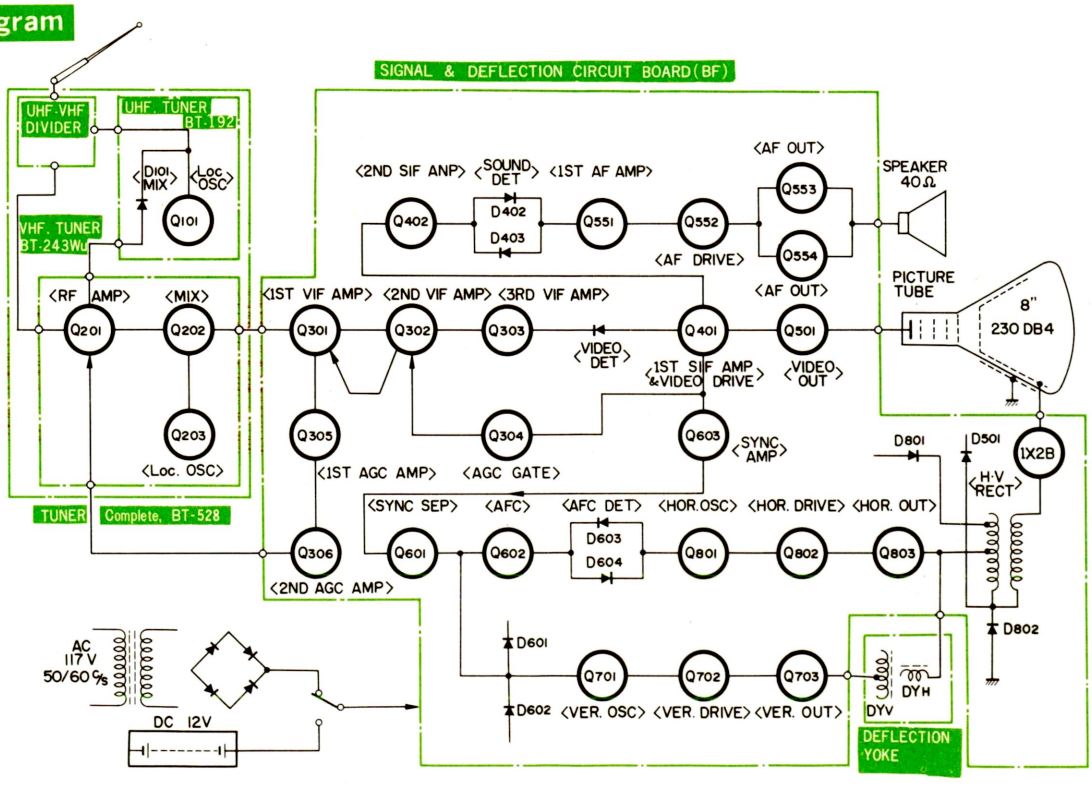
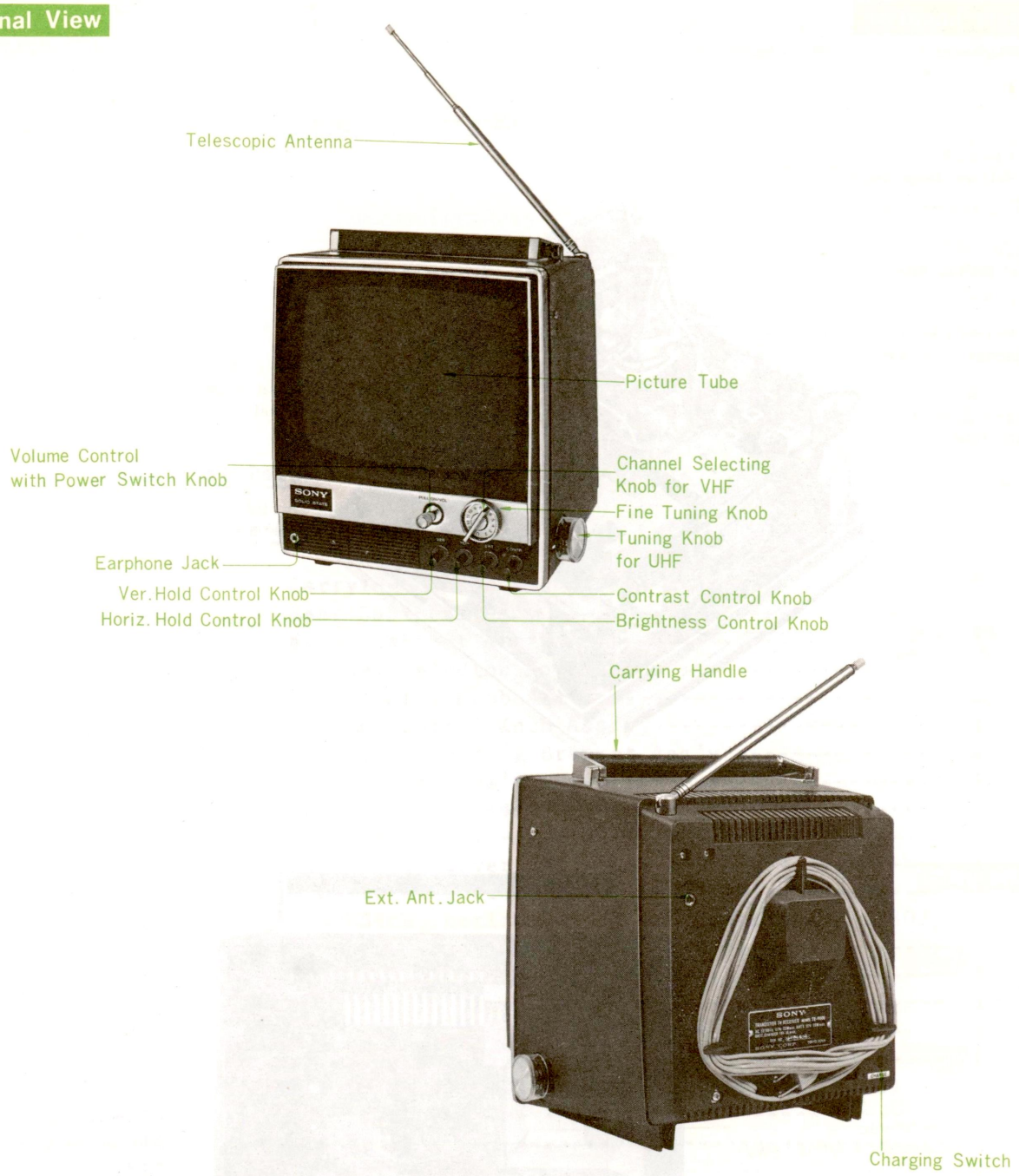
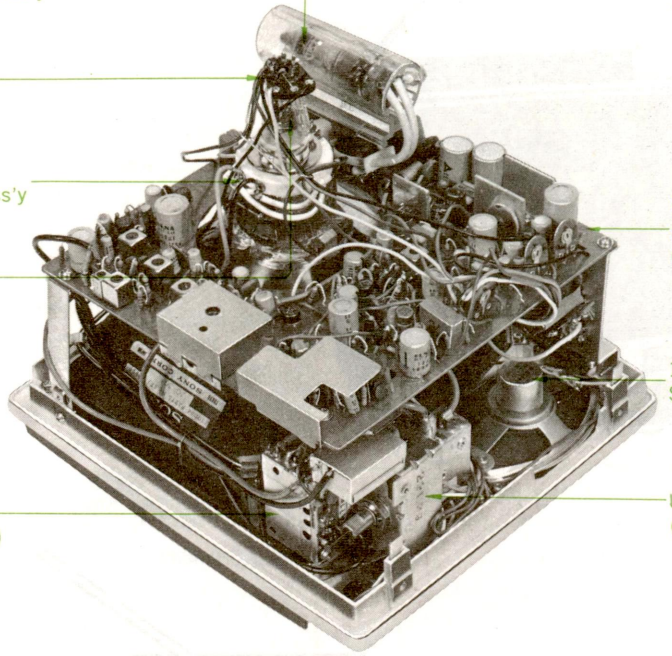
Block Diagram

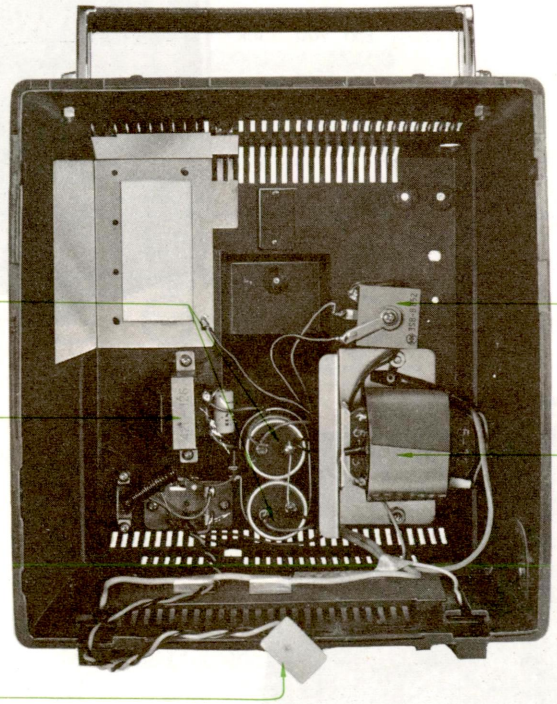


External View



Major Parts Location

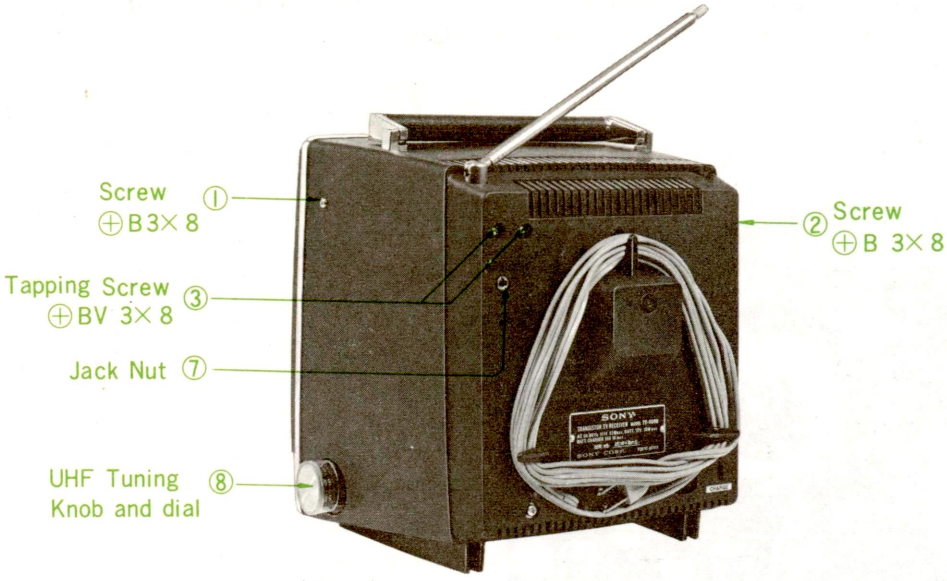




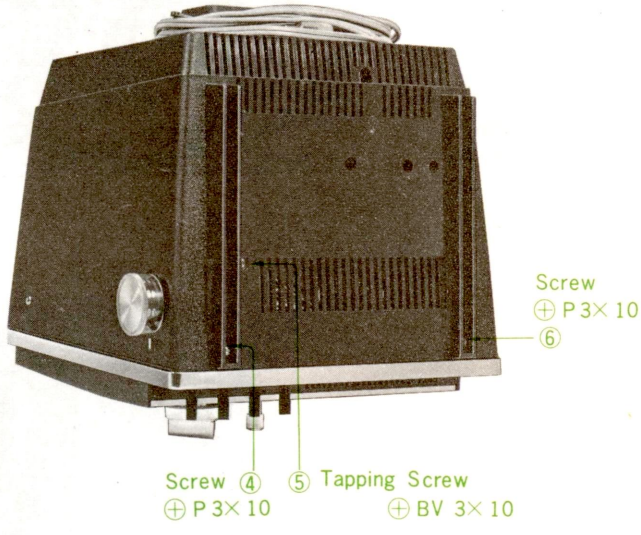
Method of Disassembling the Set

To Remove the Rear Cabinet

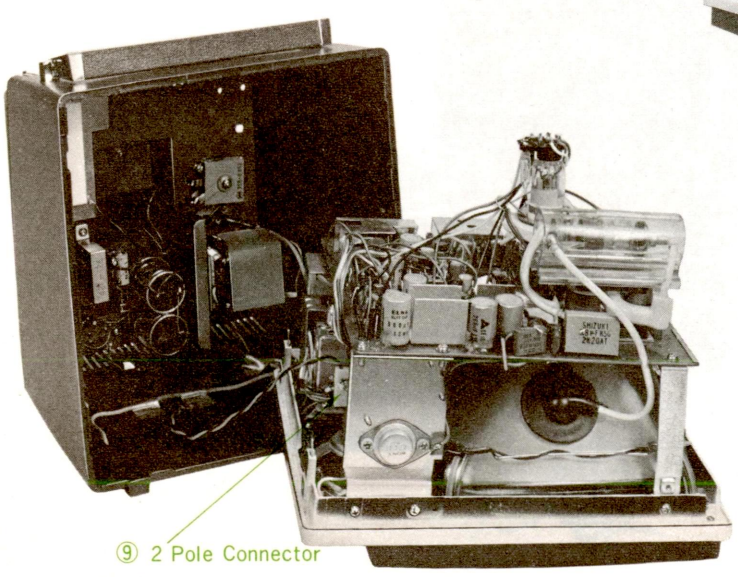
(1) Remove the seven screws (①, ②, ③, ④, ⑤ and ⑥ in Fig. 1 and 2).
(2) Remove the antenna jack nut (⑦ in Fig. 1).
(3) Pull out the UHF tuning knob and UHF dial (⑧ in Fig. 1).
(4) Pull out the 2 pole connector (⑨ in Fig. 3).



(Fig. 1)



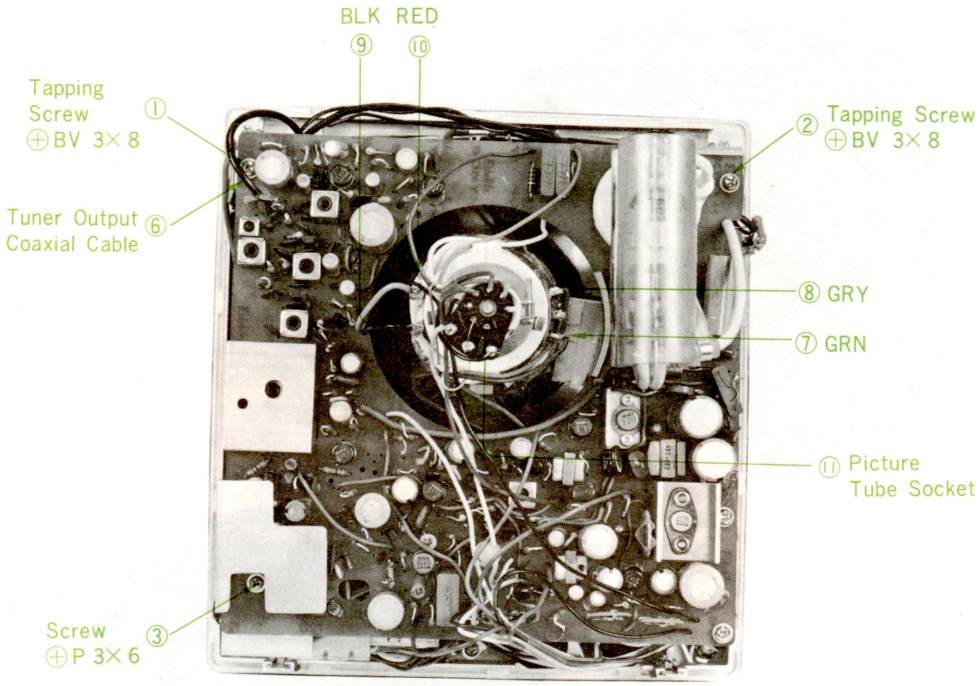
(Fig. 2)



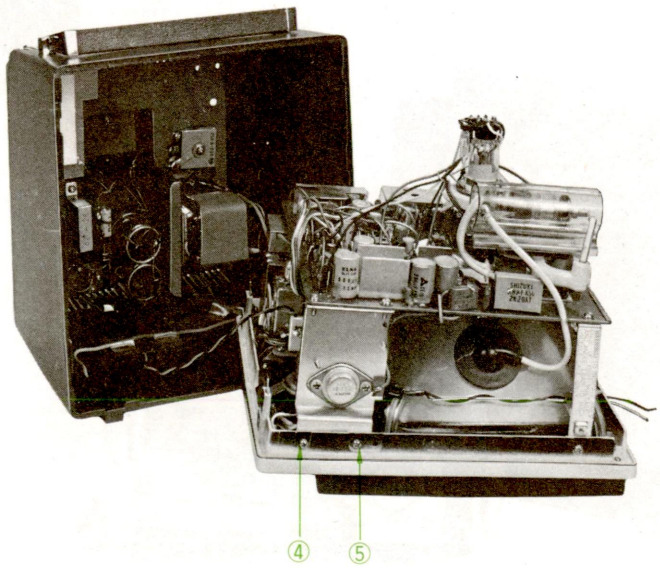
(Fig. 3)

To Remove the Circuit Board

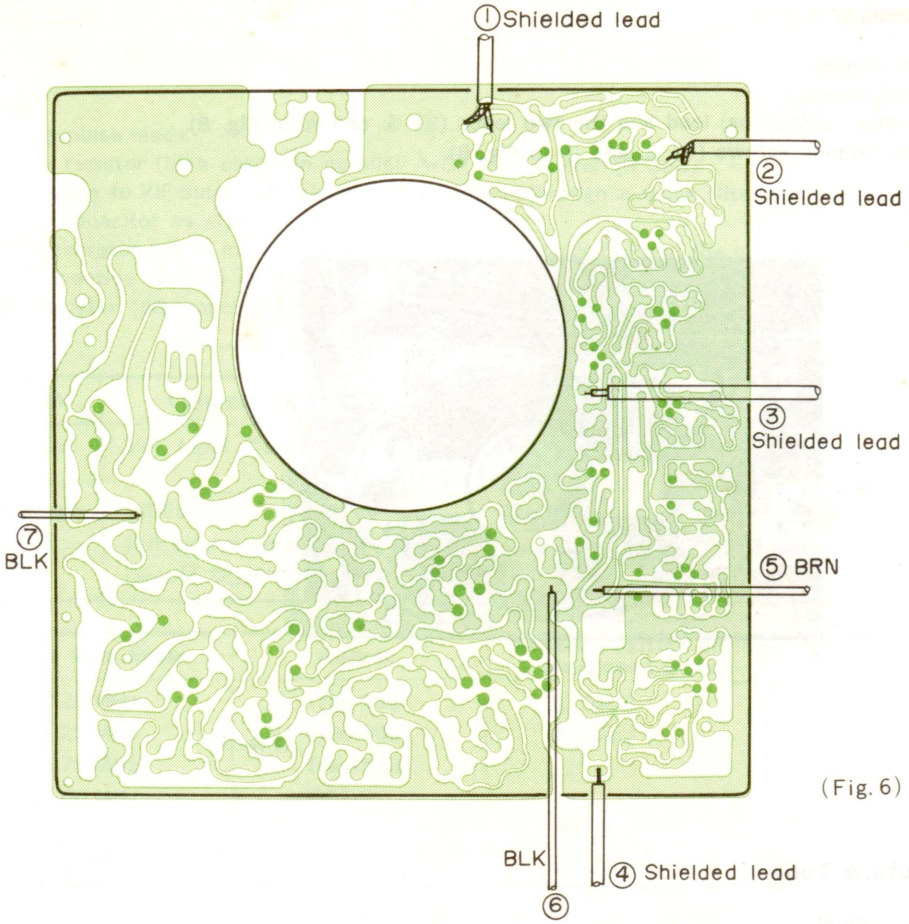
(1) Remove the rear cabinet.
(2) Disconnect the 9-pole connector.
(3) Disconnect the tuner leads (⑥ in Fig. 4).
(4) Remove the five screws (①, ② and ③ in Fig. 4. ④ and ⑤ in Fig. 5).
(5) Unsolder the black leads on the picture tube grounding spring.
(6) Disconnect the picture tube socket (⑪ in Fig. 4).
(7) Remove the anode cap.
(8) Unsolder the four deflection yoke leads (Green. Gray. Black and Red) (⑦, ⑧, ⑨ and ⑩ in Fig. 4).
(9) Unsolder the four shielded leads (①, ②, ③ and ④ in Fig. 6). and three leads (⑤, ⑥ and ⑦ in Fig. 6).



(Fig. 4)



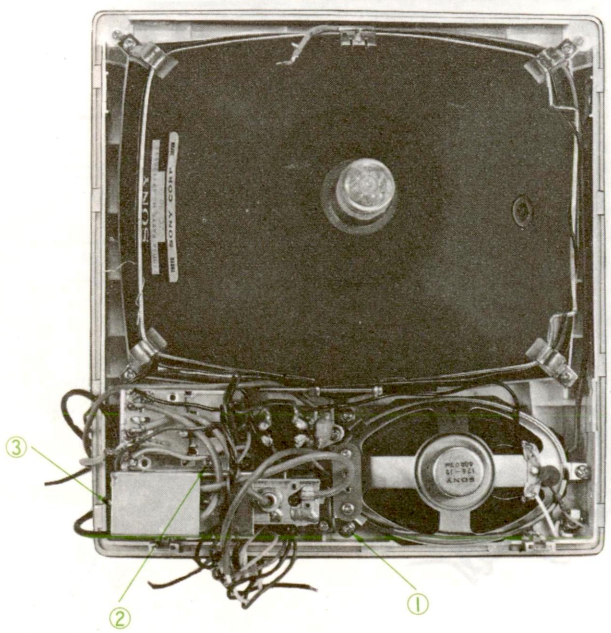
(Fig. 5)



(Fig. 6)

To Remove the Tuner Block

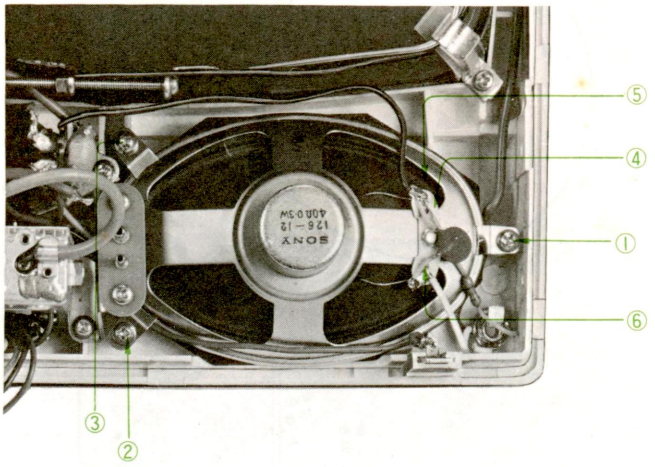
(1) Rcmove the rear cabinet.
(2) Pull out the VHF channel selector and the fine tuning knobs.
(3) Remove the three screws. (①, ② and ③ in Fig. 7).
(4) Unsolder all the corresponding leads on the circuit board.



(Fig. 7)

To Remove the Speaker

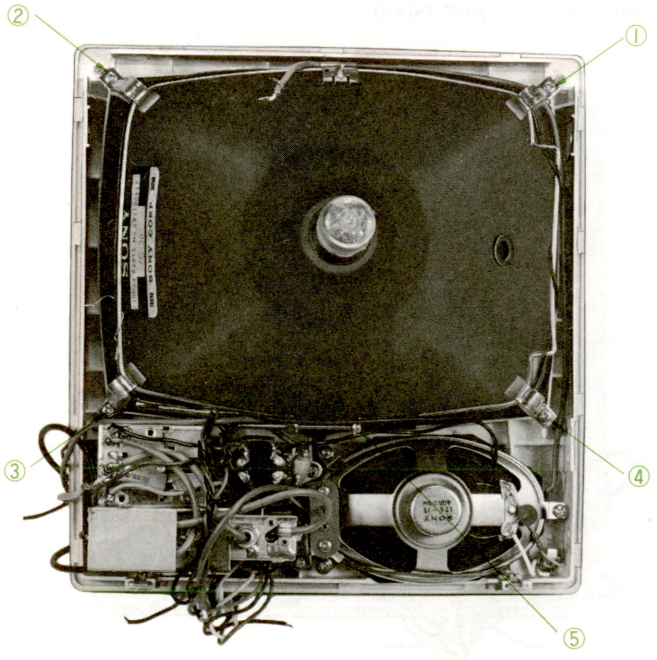
(1) Remove the rear cabinet.
(2) Remove the circuit board.
(3) Unsolder the resistor (180 ohms) lead and the two leads (④, ⑤ and ⑥ in Fig. 8).
(4) Remove the three tapping screws (①, ② and ③ in Fig. 8).



(Fig. 8)

To Remove the Picture Tube

(1) Remove the rear cabinet.
(2) Remove the circuit board.
(3) Loosen the screw (⑤ in Fig. 9).
(4) Remove the four screws (①, ②, ③ and ④ in Fig. 9).



(Fig. 9)

Adjstment Procedure

A. VIF Response Curve Adjustments

Pre-Alignment Steps

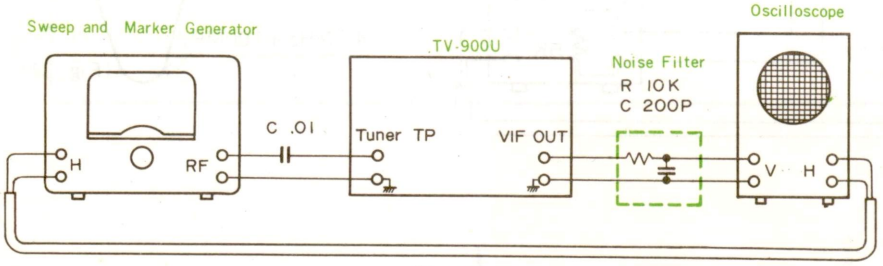
(1) Unsolder the keying pulse leads.
(2) Connect a variable resistor (50 k ohms) in parallel with the resistor (R 323).
(3) Connect an oscilloscope to VIF output terminals (across D 401) through a noise filter which consists of a 10 k ohm resistor and 200 pF capacitor as show in Fig. 10.
(4) Connect a sweep generator and a marker generator to the test point (T.P.) of the tuner through a 0.01 μF capacitor.
(5) Set the tuner to a inactive channel in area.
(6) Set the variable resistor (50 k ohms) so that the marker point Ⓐ of the response curve on the oscilloscope is approximately 1.4 V.

Step	Equipment	Connection	Freq.	Adjust	Remarks
1	Signal Gen.	VIF Input Terminal	33.75 MHz (AM, 1 k Hz, 40%)	Trap-303	
	Oscilloscope	VIDEO DET OUT [VIF output terminals (across D_{401})]			for minimum modulated Waveform.

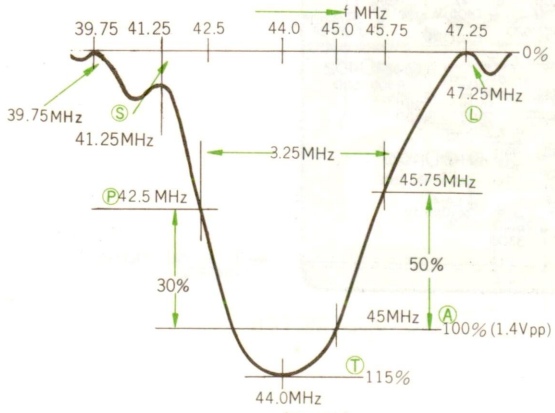
Step	Marker Gen. Freq.	Adjust	Marker Position on the Response Curve	Remarks
2	47.25 MHz	Trap-301	Ⓛ (dip.)	
3	41.25 MHz	Trap-302	Ⓢ (dip.)	
4	33.75 MHz	Trap-303		VIF Standard response curve see Fig. 11.
5	44.00 MHz	VIFT-2		
		VIFT-3	Ⓣ (115 $\pm^{10}_{5}$%)	
6	45.00 MHz	VIFT-4	Ⓐ (100%)	

Repeat the above steps 4 and 5 until a proper VIF response curve is obtained.

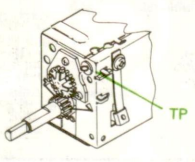
NOTE : If a proper response curve similar to Fig. 11 is not obtained by the adustment procedures described above, replace the damping resistor (R_{306}, R_{310}, R_{314}) with proper one for best result.



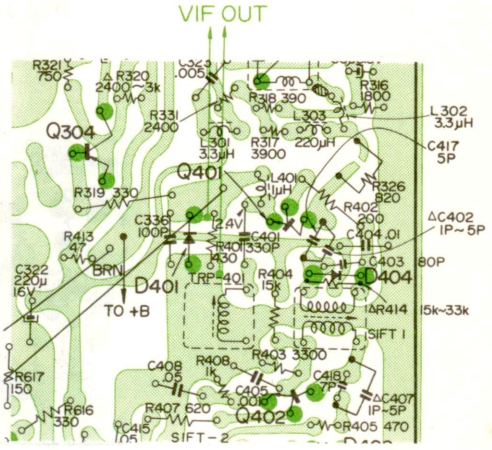
(Fig. 10)



(Fig. 11)



VHF Tuner



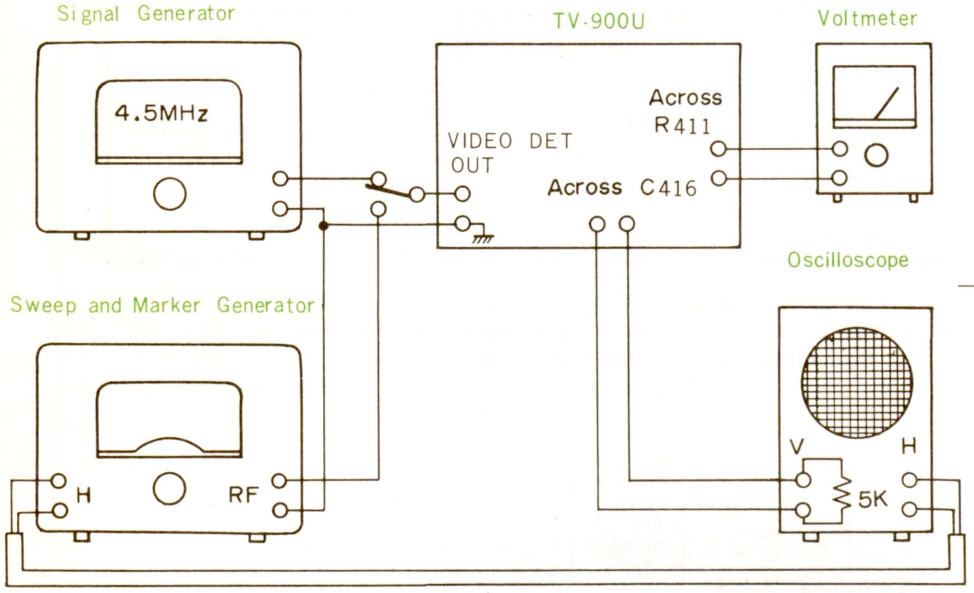
B. SIF Adjustments

Pre-Alignment Step

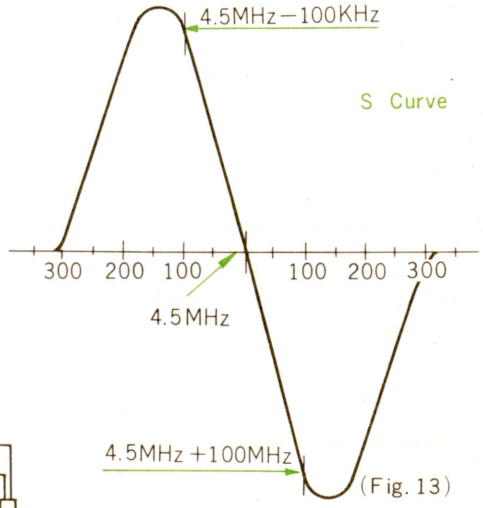
(1) Set the brightness control to the optimum and the contrast control to the maximum positions.
(2) Remove the tuner output leads.
(3) Connect 5 k ohm resistor across SIF output terminal and ground as shown in Fig. 12.

Step	Equipment	Connection	Freq.	Adjust	Remarks
1	Test Oscillator	VIDEO DET OUT	4.5 MHz	TRAP-401	for minimum stripes on the picture.
2	Same	Same	4.5 MHz	$SIFT_1$ & Pri. of $SIFT_2$ (Pink)	for maximum reading on the Voltmeter.
	Voltmeter	Across R_{411}			
3	Sweep Gen.	VIDEO DET OUT	4.5 MHz (AM)	Sec. of $SIFT_2$ (Blue)	for minimum modulated wave.
	Standard Signal Gen.	Same			Standard S curve see Fig. 13.
	Oscilloscope	Across C_{416}			

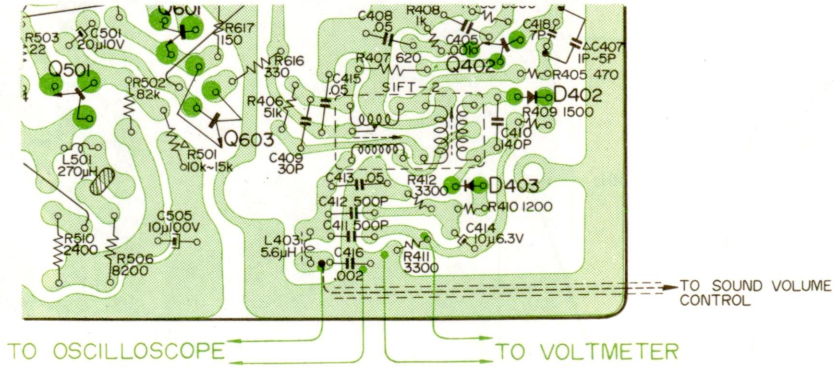
NOTE: (1) Repear above procedures two or three times.
(2) If S curve is not symmetrical with respect to the intersection of the S curve and return line, adjust primary of SIFT 2 for optimum result.



(Fig. 12)

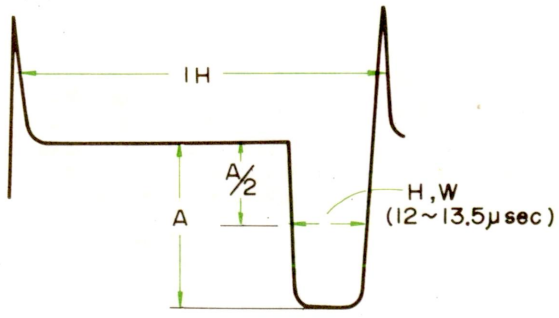


(Fig. 13)



C. Deflection Circuit Adjustments

Step	Adjust for	Preliminary Instruction	Equipment	Connection	Adjust	Remarks
1	Ic of Q_{501} (VD. Out)	Set to inactive channel. Check 12V Power Supply. Set the Brightness control to the maximum and the Contrast control to the minimum position.	Voltmeter	Across R_{506}	R_{501} (10~15 K)	For approx. 38V reading.
2	Ic of Q_{703} (Vert. Out)	Lock in Sync. Check 12V Power Supply.	Same	Across R_{711}	R_{707} (150Ω~750Ω)	For approx. 0.41~0.44V
3	Vert. Height and Linearity	Receive a Test Pattern.			VR_{701} (Vert. Lin.) VR_{702} (Vert. Height)	For optimum Vertical Height and Linearity on the pattern.
4	Pulse Width	Lock in Sync.	Oscilloscope	Emitter of Q_{801}	C_{805} (0~0.068μF)	For 12~13.5μsec, (Fig. 13)
5	HSC (Horizontal Stability Coil)	Lock in Sync. Receive a Test Pattern.			HSC	So that the picture is stable in either case where HSC is shorted or normal.
6	Ic of Q_{802} (Hor. Drive)		Ammeter	Between Collector of Q_{802} & R_{806}	R_{806} (1~30Ω)	For 70~80mA reading on the Ammeter.
7	Horizontal Frequency	Set the Contrast and Brightness Controls to optimum positions. Receive a Test Pattern.			VR_{601} (Hor. Freq.)	To obtain same number of diagonal bars by applying some electrical shocks respectively when setting VR_4 to fully clockwise and counter-clockwise positions.
8	Focus	Same Lock in Sync.			Position of Fourth grid lead for Picture Tube.	To either originally soldered point or ground, whichever gives better focus.

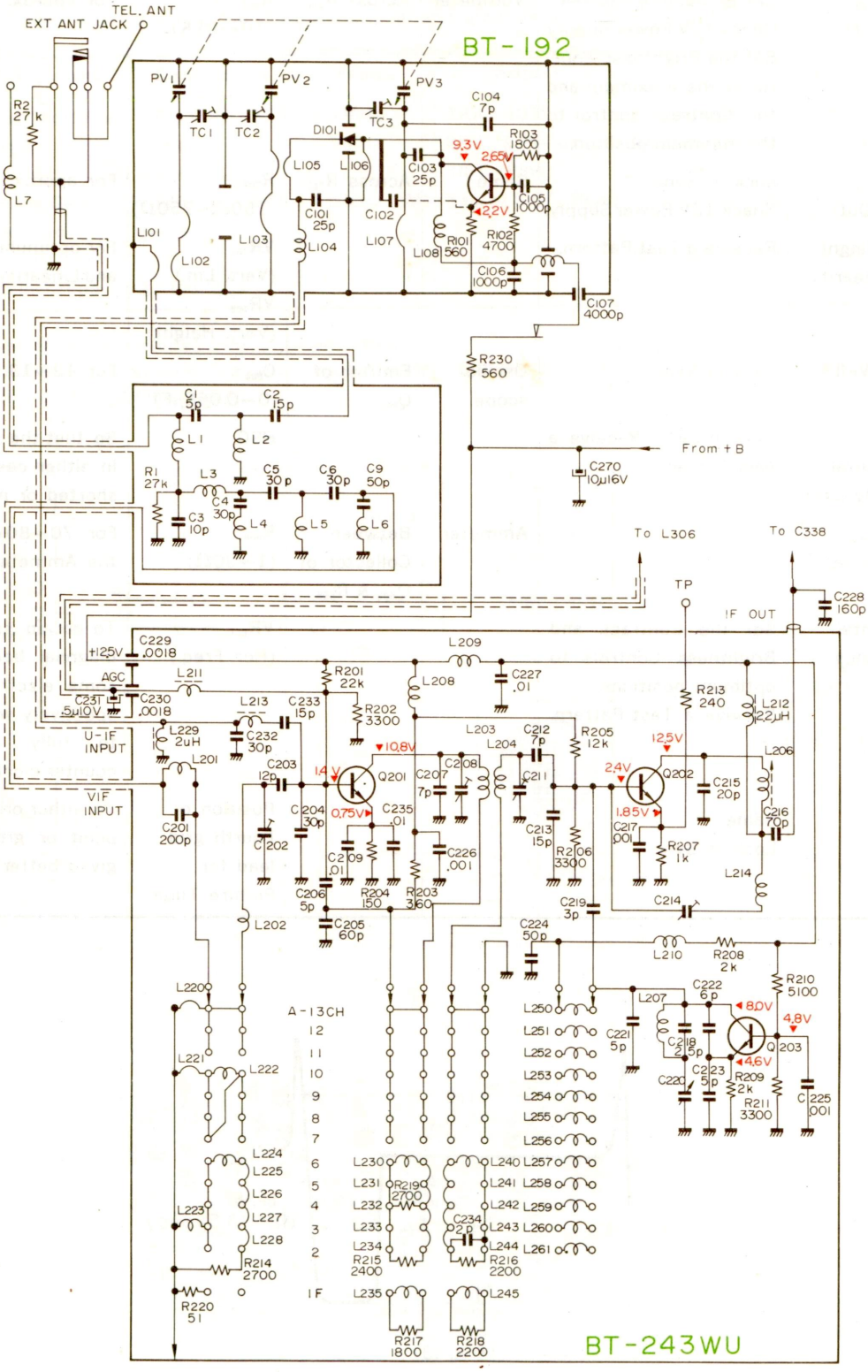


(Fig. 13)

Schematic Diagram

— Tuner Circuit —

D101 2D82A Q101 2SC288A (OSC)

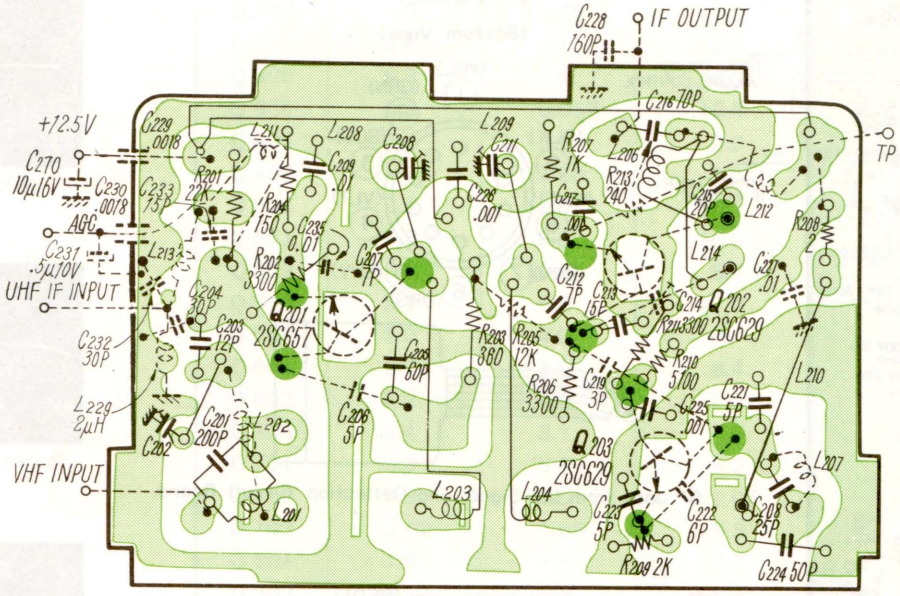


Q201 2SC657 (RF AMP) Q202 2SC629 (MIX) Q203 2SC629 (OSC)

Mounting Diagram

VHF Tuner Circuit Board

— Conductor Side —



TRANSISTOR VOLTAGE CHART (V)

	Collector	Base	Emitter
Q_{201} (2SC657)	10.8	1.4	0.75
Q_{202} (2SC629)	12.5	2.4	1.85
Q_{203} (2SC629)	8.0	4.8	4.6

* Power Supply Voltage: DC 12.5 V
* Measured with a 20,000-ohms-per-volt VOM.
* Measured from ground to point indicated.

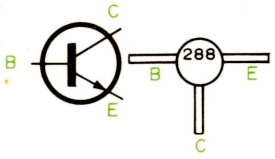
☆L_{202}, L_{207}, L_{211}, L_{212}, L_{213}, L_{229}, C_{204}, C_{206}, C_{207}, C_{214}, C_{222}, C_{227}, C_{232}, C_{233}, R_{205}, R_{213}, Q_{201}, Q_{202} and Q_{203} are mounted on the conductor side.

☆C_{228}, C_{230} and C_{270} are mounted on the conductor side.

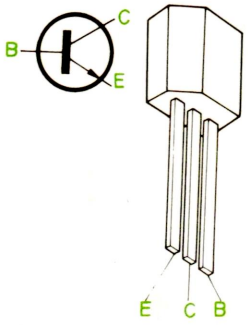
Semiconductor

—External View and Lead Connection—

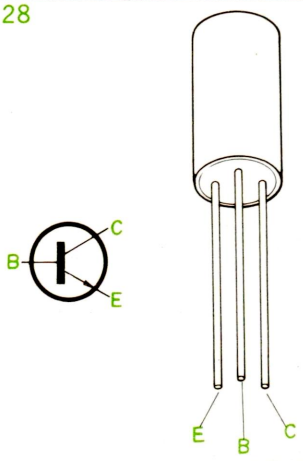
2SC288



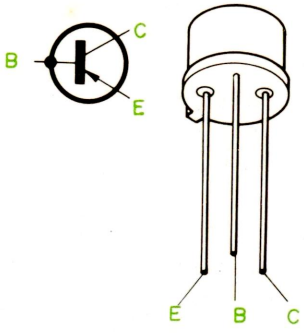
2SC629
2SC633
2SC657
2SC403A



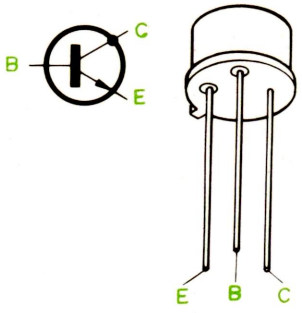
2SD128



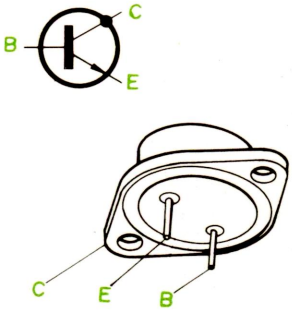
2SB381
2SB382



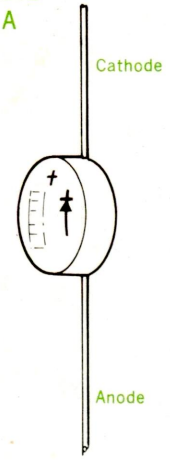
2SC470
2SC756



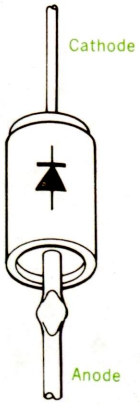
2SC41



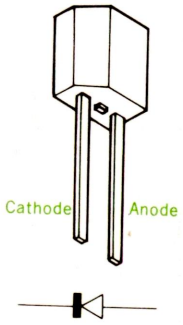
HFSDIZ
SD1A



DGINR



1T240



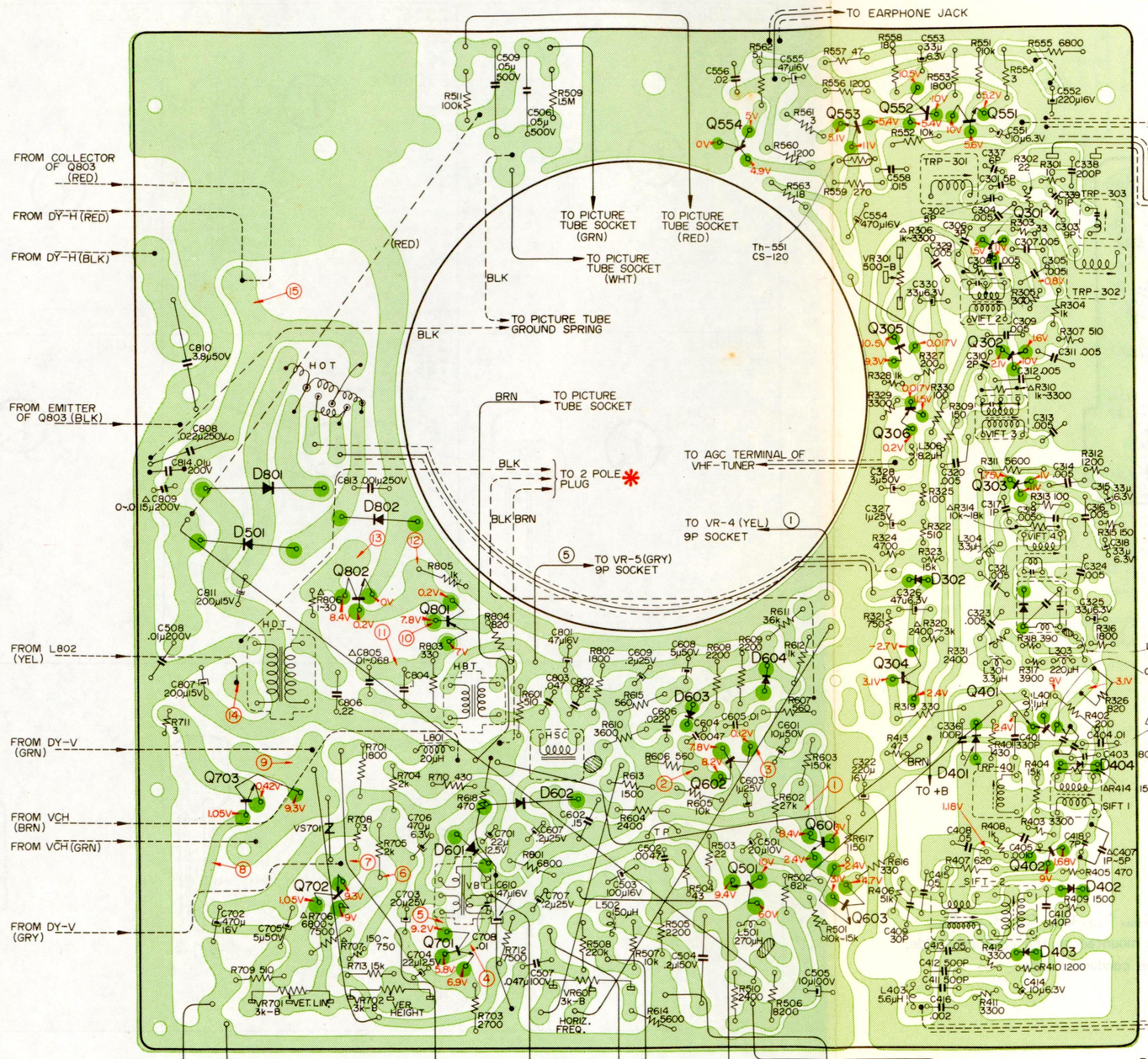
1T22
1T22A
1T23

B : Base
E : Emitter
C : Collector

Mounting Diagram

Signal and Deflection Circuit Board

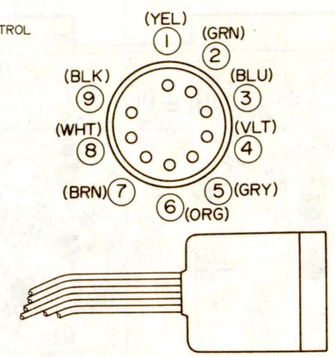
— Conductor Side —



SEMICONDUCTOR

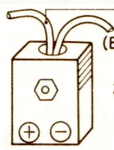
Q301	2SC657
Q302	2SC657
Q303	2SC629
Q304	2SB382
Q305	2SB382
Q306	2SC403A
Q401	2SC403A
Q402	2SC403A
Q501	2SC470
Q551	2SC633
Q552	2SB381
Q553	2SDI28
Q554	2SB381
Q601	2SC403A
Q602	2SB379
Q603	2SC403A
Q701	2SDI28
Q702	2SB381
Q703	2SC756
Q801	2SB381
Q802	2SC756
D302	IT22
D401	IT240
D402	IT23
D403	IT23
D404	IT22
D501	HFSDIZ
D601	IT22A
D602	IT22A
D603	IT22
D604	IT22
D801	DGINR
D802	SDIA

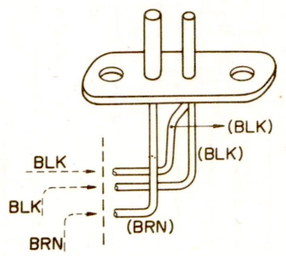
9P SOCKET
(Bottom View)

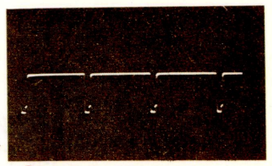


9P Jack from the Signal and Deflection Circuit Board.

* 2P SOCKET

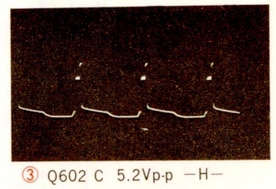






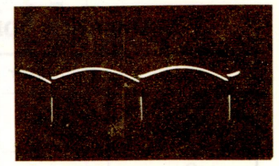
① Q601 C 9Vp-p —H—

② Q602 E 5Vp-p —H—



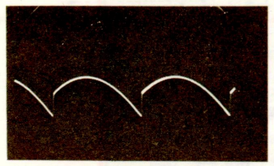
③ Q602 C 5.2Vp-p —H—

④ Q701 B 4Vp-p —H—

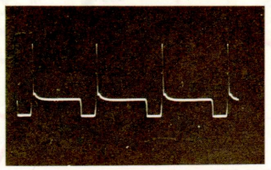


⑤ Q701 C 4Vp-p —V—

* Resistance and capacitance values marked with △ are to be selected.
* All voltage measured with a VOM (20k ohms/Volt).
* Measured from ground to point indicated.
* R_{618}, R_{470}, R_{326}, R_{314}, R_{310}, R_{306}, C_{814}, C_{610}, C_{407} and C_{402} are mounted on the conductor side.
* The above number (①~⑮) are common with numbers (①~⑮) shown in waveforms.

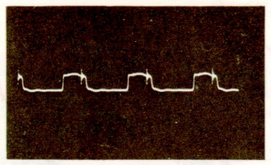


⑥ Q702 B 2Vp-p —V—



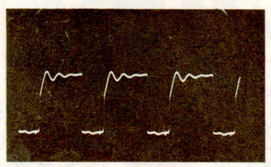
⑪ Q801 E 3.5Vp-p —H—

⑦ Q702 E 1.8Vp-p —V—

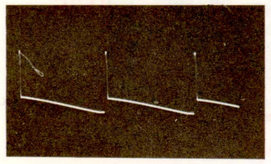


⑫ Q802 B 0.7Vp-p —H—

⑧ Q703 B 1.3Vp-p —V—

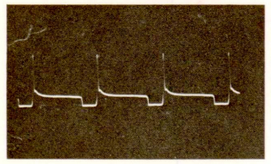


⑬ Q802 C 14Vp-p —H—

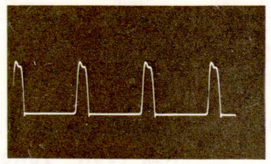


⑨ Q703 C 60Vp-p —V—

⑭ Q803 B 4Vp-p —H—



⑩ Q801 B 48Vp-p —H—

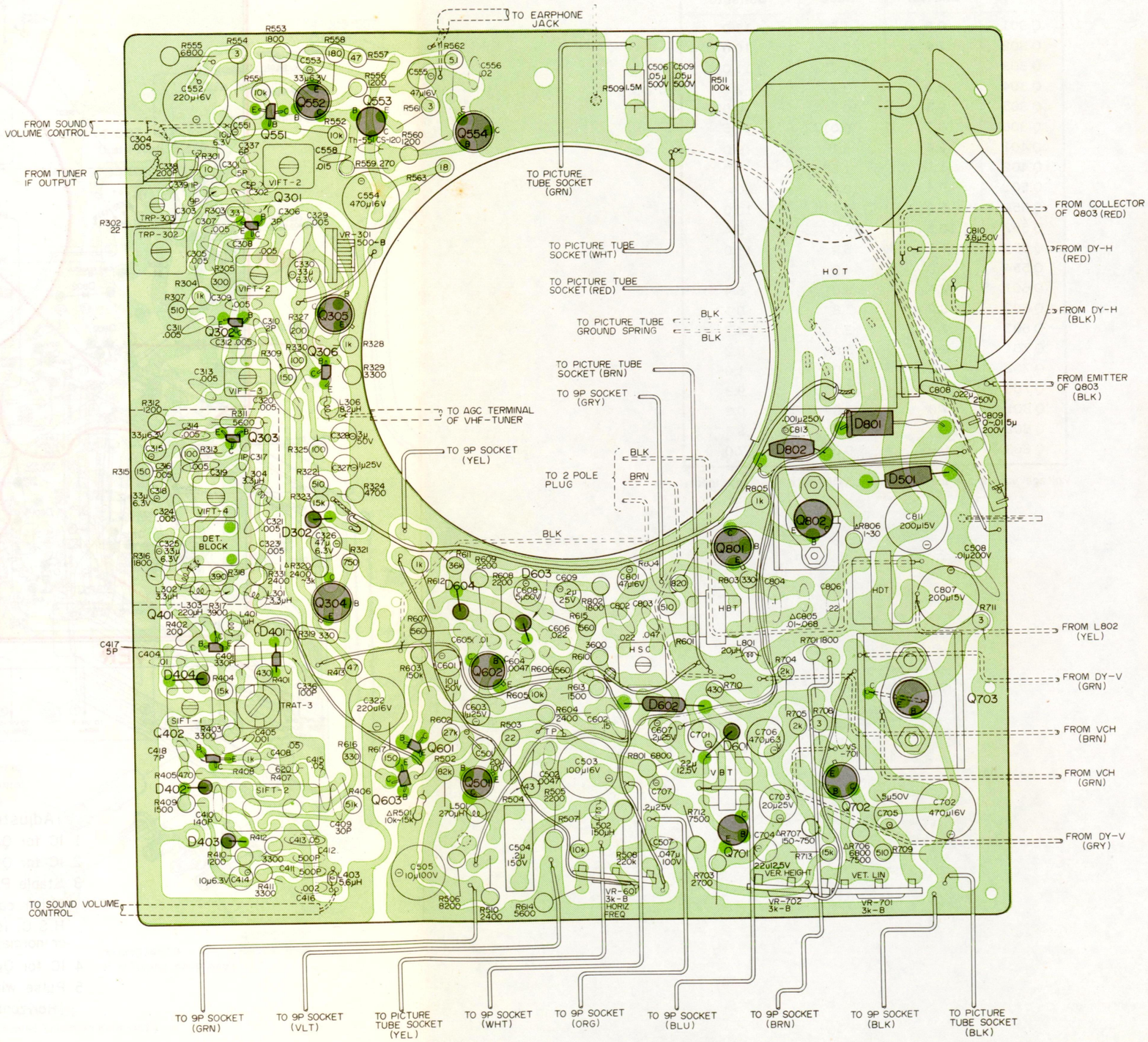


⑮ Q803 C 120Vp-p —H—

Mounting Diagram

Signal and Deflection Circuit Board

— Component Side —



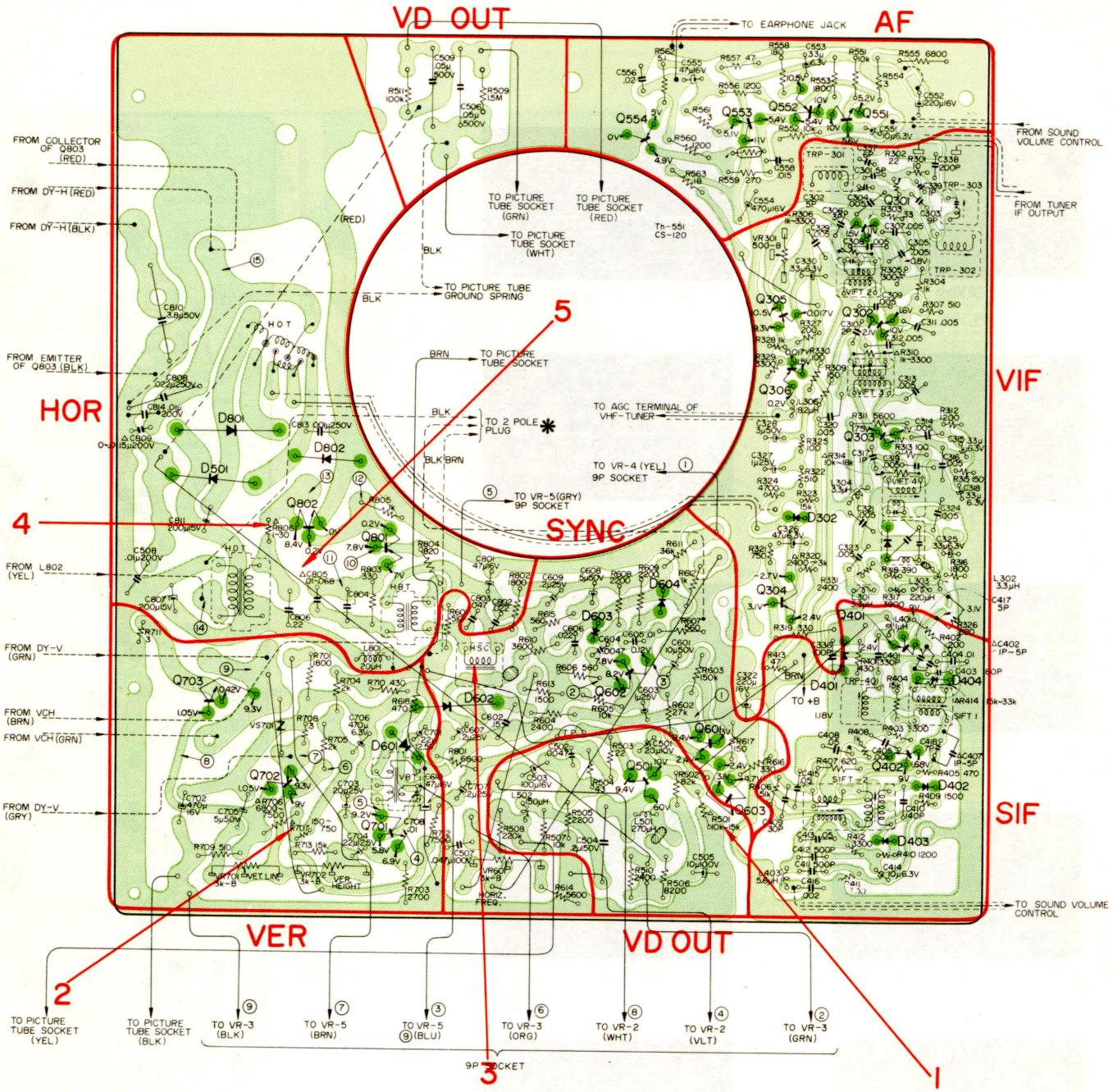
SEMICONDUCTOR	
Q301	2SC657
Q302	2SC657
Q303	2SC629
Q304	2SB382
Q305	2SB382
Q306	2SC403A
Q401	2SC403A
Q402	2SC403A
Q501	2SC470
Q551	2SC633
Q552	2SB381
Q553	2SD128
Q554	2SB381
Q601	2SC403A
Q602	2SB379
Q603	2SC403A
Q701	2SD128
Q702	2SB381
Q703	2SC756
Q801	2SB381
Q802	2SC756
D302	1T22
D401	1T240
D402	1T23
D403	1T23
D404	1T22
D501	HFSDIZ
D601	1T22A
D602	1T22A
D603	1T22
D604	1T22
D801	DGINR
D802	SDIA

Transistor Voltage Chart

	Emitter	Base	Collector
Q 301	0.8	1.5	11.0
Q 302	1.6	2.1	10.0
Q 303	1.0	1.75	11.0
Q 304	2.4	3.1	−2.7
Q 305	9.3	10.5	0.017
Q 306	0.2	0.017	12.5
Q 401	2.4	3.1	9.0
Q 402	1.18	1.68	9.0
Q 501	9.4	10.0	60
Q 551	5.2	5.6	10.0
Q 552	10.5	10.0	5.4
Q 553	5.1	5.4	11.0
Q 554	5.0	4.9	0
Q 601	2.4	3.0	8.4
Q 602	8.2	7.8	0·12
Q 603	2.4	3.1	4.7
Q 701	6.9	5.8	9.2
Q 702	9.3	9.0	1.05
Q 703	0.42	1.05	9.3
Q 801	7.0	7.8	0.2
Q 802	0	0.2	8.4
Q 803	0	0.03	17.0

Voltage values are measured with VOM with no signal input.

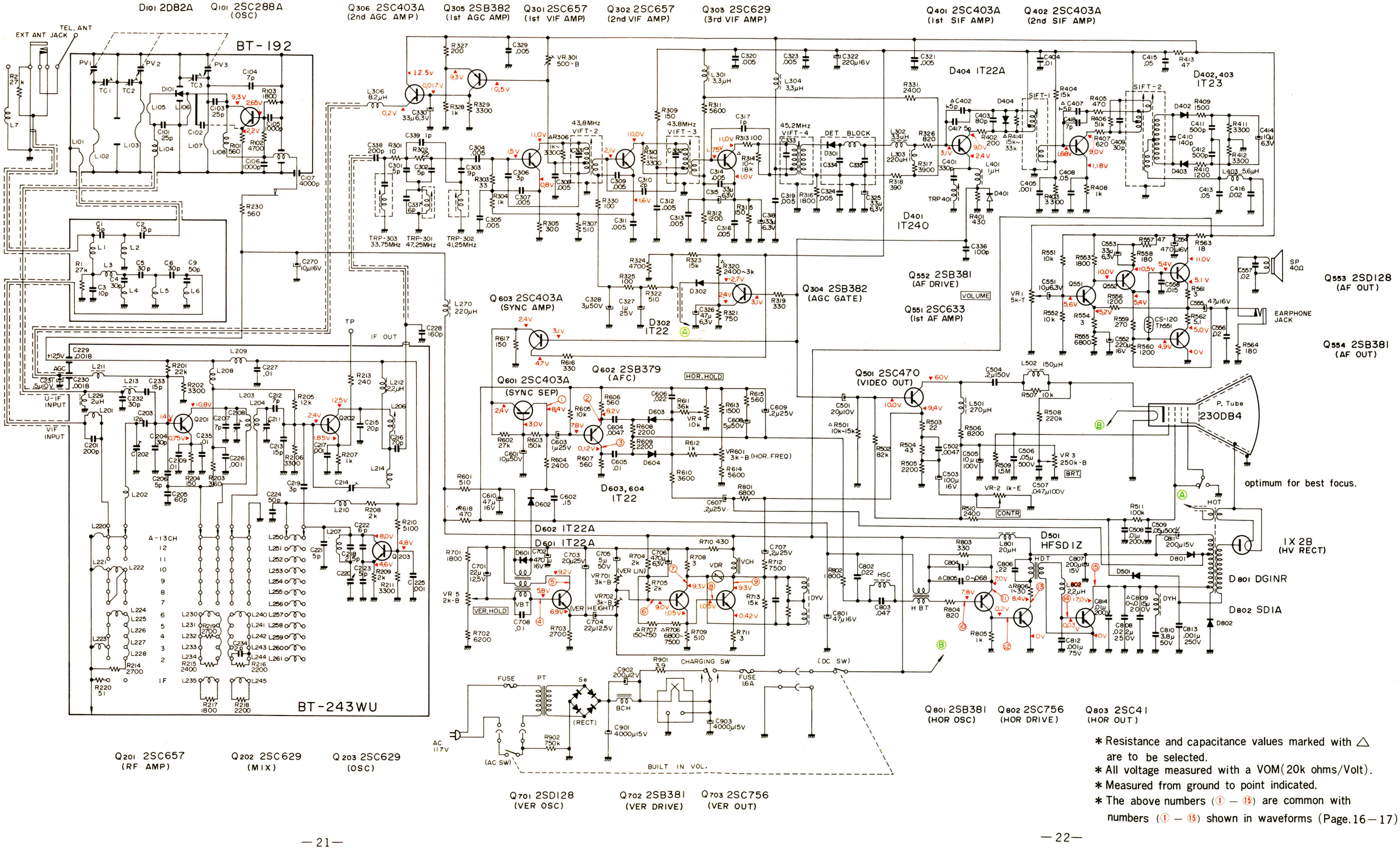
Location of Adjustment Parts



Adjustment	Adjustment Parts
1 IC for Q_{501}	R_{501} (10K−15Kohms)
2 IC for Q_{703}	R_{707} (150−750ohms)
3 Stable Picture in either case where H.S.C. is shorted or normal.	H.S.C.
4 IC for Q_{802}	R_{806} (1−3ohms)
5 Pulse width (Horizontal)	C_{805} (0−0.068 μF)

Schematic Diagram

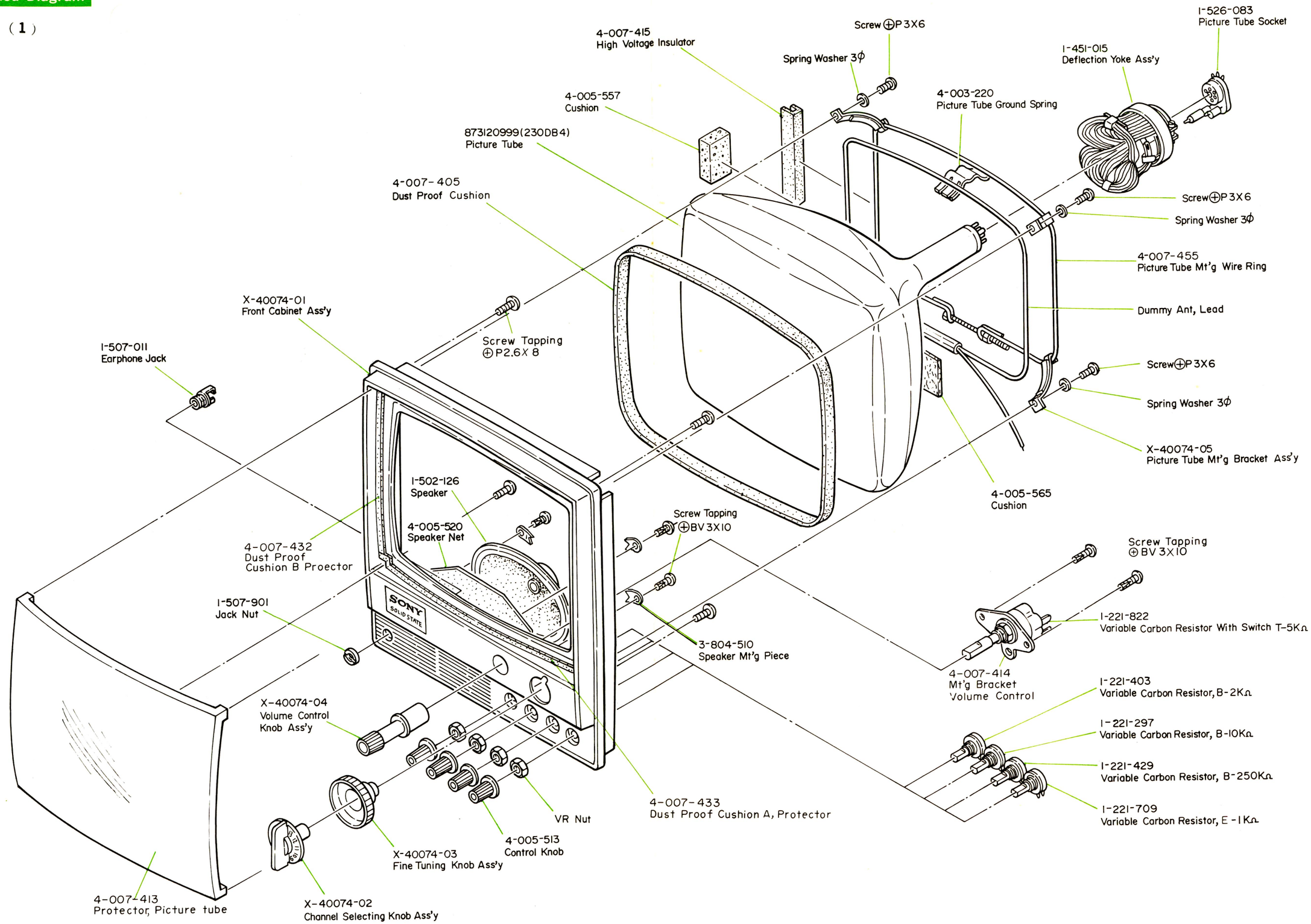
General



* Resistance and capacitance values marked with △ are to be selected.
* All voltage measured with a VOM(20k ohms/Volt).
* Measured from ground to point indicated.
* The above numbers (① — ⑮) are common with numbers (① — ⑮) shown in waveforms (Page.16—17).

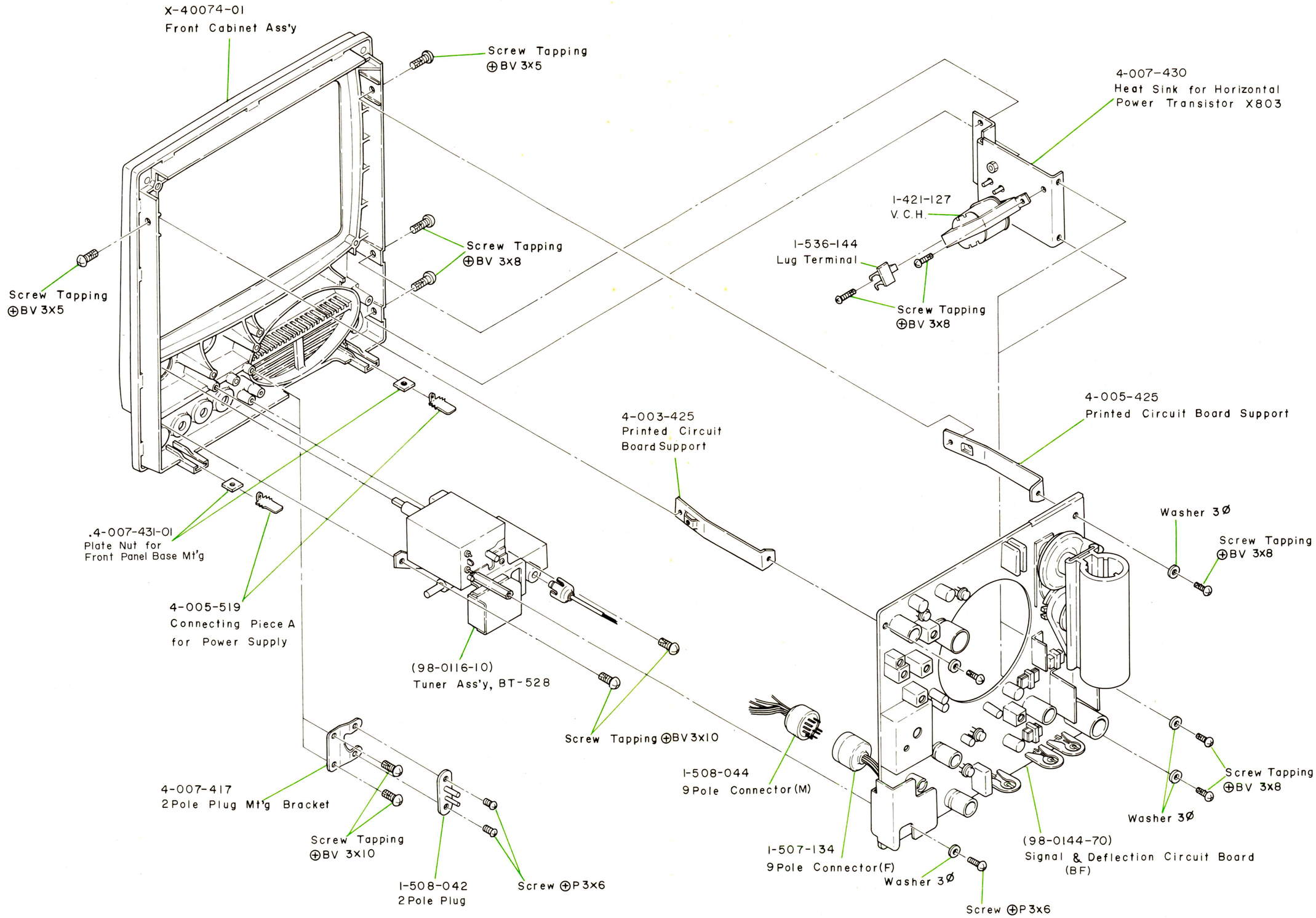
Exploded Diagram

(1)



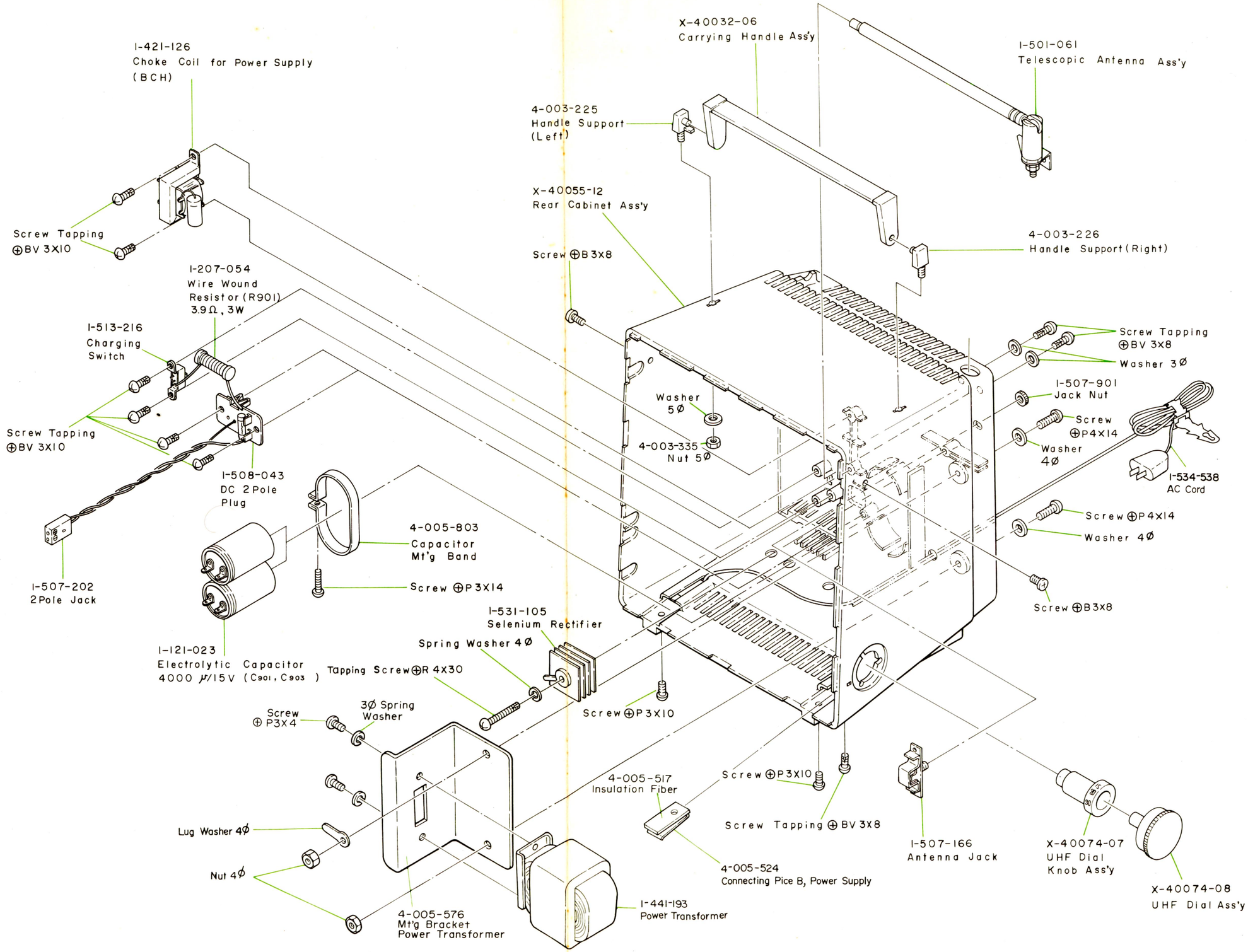
Exploded Diagram

(2)



Exploded Diagram

(3)



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